DIVISION 2

SECTION 3102F – AUDIT AND INSPECTION

3102F.1 General.

3102F.1.1 Purpose. *Section 3102F defines minimum requirements for audit, inspection, and evaluation of the structural, mechanical and electrical components and systems.*

3102F.1.2 Audit and Inspections Types. *The audit and inspections described in this Chapter (31F) and 2 CCR 2320 (a) and (b) [2.1] are:*

1. *Annual Inspection*
2. *Audit*
3. *Post-Event Inspection*

Each has a distinct purpose and is conducted either at a defined interval (see Tables 31F-2-1 and 31F-2-2), as a result of a potentially damaging event or a significant change in operations. In the time between audits and inspections, operators are expected to conduct periodic walk-down examinations of the MOT to detect potentially unsafe conditions.

3102F.1.3 Berthing Systems. *For the purpose of assigning structural ratings and documenting the condition of mechanical and electrical systems, an MOT shall be divided into independent "berthing systems." A berthing system consists of the wharf and supporting structure, mechanical and electrical components that serve the berth and the entire pipeline from the loading arm or manifold to the last valve before the pipeline enters a tank storage area.*

For example, a MOT consisting of wharves with three berths adjacent to the shoreline could contain three independent "berthing systems" if the piping does not route through adjacent berths. Therefore, a significant defect that would restrict the operation of one berth would have no impact on the other two berths. Conversely, if a T-head Pier, with multiple berths sharing a trestle that supports all piping to the shoreline, had a significant deficiency on the common trestle, the operation of all berths could be adversely impacted. This configuration is classified as a single berthing system.

The physical boundaries of a berthing system may exclude unused sections of a structure. Excluded sections must be physically isolated from the berthing system. Expansion joints may provide this isolation.

3102F.1.4 Records. *All MOTs shall have records reflecting current, as-built conditions for all berthing systems. Records shall include, but not be limited to modifications and/or replacement of structural components, electrical or mechanical equipment or relevant operational changes, new construction including design drawings, calculations, engineering analyses, soil borings, equipment manuals, specifications, shop drawings, technical and maintenance manuals and documents.*

Chronological records and reports of Annual Inspections, Audits and Post-Event Inspections and documentation of equipment or structural changes shall be maintained.

Records shall be indexed and be readily accessible to the Division (see 2 CCR Section 2320 (c) (2)) [2.1].

3102F.1.5 Baseline Inspection. *If "as-built" or subsequent modification drawings are not available, incomplete, or inaccurate, the Audit must include a Baseline Inspection to gather data in sufficient detail to adequately evaluate the MOT.*

The level of detail required shall be such that structural member sizes, connection and reinforcing details are documented, if required in the structural analysis. In addition, the strength and/or ductility characteristics of construction materials shall be determined, as appropriate. Non-destructive testing, partially destructive testing and/or laboratory testing methods may be used.

All fire, piping, mechanical and electrical systems shall be documented as to location, capacity, operating limits, and physical conditions.

3102F.2 Annual Inspection. *The Annual Inspection required by 2 CCR 2320 (a)(1) [2.1], may include an engineering examination of the topside and underside areas of the dock, including the splash zone. The Division shall perform the inspection, with cooperation from the owner/operator. Observations will be recorded and a report of violations and deficiencies shall be provided to the operator.*

Subject to operating procedures, a boat shall be provided to facilitate the inspection of the dock undersides and piles down to the splash zone. If a boat is not available or the under dock inspection cannot be performed by the Division during the Annual Inspection, the MOT operator shall carry out or cause to be carried out, such an inspection. The operator will then provide the Division with a report detailing the examination results including photographs, videos and sketches as necessary to accurately depict the state of the underside of the dock.

3102F.3 Audit.

3102F.3.1 Objective. *The objective of the Audit is to review structural, mechanical and electrical systems on a prescribed periodic basis to verify that each berthing system is fit for its specific defined purpose. The Audit includes both above water and underwater inspections, as well as engineering analyses.*

3102F.3.2 Overview. *The Initial Audit shall include above water and underwater structural inspections, mooring, berthing and structural evaluations, and electrical/mechanical systems evaluation. The audit is performed by a multi-disciplinary team of engineers, qualified inspectors and may include Division representatives.*

The above water inspection involves an examination of all structural, mechanical and electrical components above the waterline. Structural defects and their severity shall be documented, but the exact size and location of each deficiency is typically not required.

Representative underwater sampling may be acceptable with Division approval, for cases of limited visibility, heavy marine growth, restricted inspection times because of environmental factors (currents, water temperatures, etc.) or a very large number of piles [2.2].

A global Condition Assessment Rating (CAR) shall be assigned to above and underwater structural systems (Table 31F-2-5).

Remedial Action Priorities (RAP) shall be assigned for component deficiencies (Table 31F-2-6). Recommendations for remediation and/or upgrading shall be prescribed as necessary.

An Audit is not considered complete until the Audit Report is received by the Division.

3102F.3.3 Schedule.

3102F.3.3.1 Initial Audit. *Table 31F-2-1 provides the deadlines for the submission of the Initial Audit report. The MOT classification in Table 31F-2-1 is determined from the higher assigned risk classification obtained from Table 31F- 4-1.*

TABLE 31F- 2-1

INITIAL AUDIT REPORT SUBMISSION DEADLINE FOR EXISTING BERTHING SYSTEMS

Risk Classification[1]	***Submission Deadline[2]***
High	*30 Months*
Medium	*48 Months*
Low	*60 Months*

1 As defined in Tables 31F-4-1 and 31F-5-1
2 From the effective date of this Chapter (31F)

TABLE 31F - 2- 2

MAXIMUM INTERVAL BETWEEN UNDERWATER AUDIT INSPECTIONS (YEARS)[1]

Condition Rating From Previous Inspection	***CONSTRUCTION MATERIAL***				***Channel Bottom or Mudline – Scour[4]***	
	Unwrapped Timber or Unprotected Steel (no coating or cathodic protection)[4]		***Concrete, Wrapped Timber, Protected Steel or Composite Materials (FRP, plastic, etc.)[4]***			
	Benign[2] Environment	***Aggressive[3] Environment***	***Benign[2] Environment***	***Aggressive[3] Environment***	***Benign[2] Environment***	**Aggressive[3] Environment**
6 (Good)	*6*	*4*	*6*	*5*	*6*	*5*
5 (Satisfactory)	*6*	*4*	*6*	*5*	*6*	*5*
4 (Fair)	*5*	*3*	*5*	*4*	*6*	*5*
3 (Poor)	*4*	*3*	*5*	*4*	*6*	*5*
2 (Serious)	*2*	*1*	*2*	*2*	*2*	*2*
1 (Critical)	*N/A[5]*	*N/A[5]*	*N/A[5]*	*N/A[5]*	*N/A[5]*	*N/A[5]*

1. *The maximum interval between Underwater Audit Inspections shall be reduced as appropriate based on the extent of deterioration observed on a structure, the rate of further anticipated deterioration, or other factors.*
2. *Benign environments include fresh water and maximum current velocities less than 1.5 knots for the majority of the days in a calendar year*
3. *Aggressive environments include brackish or salt water, polluted water, or waters with current velocities greater than 1.5 knots for the majority of the days in the calendar year.*
4. *For most structures, two maximum intervals will be shown in this table, one for the assessment of construction material (timber, concrete, steel, etc) and one for scour (last 2 columns). The shorter interval of the two should dictate the maximum interval used.*
5. *MOTs rated "Critical" will not be operational; and Emergency Action shall be required in accordance with Table 31F-2-7.*

For a new MOT berthing system, the Initial Audit shall be performed within three years of commencement of operations.

3102F.3.3.2 Subsequent Audits. *An above water Audit of structural, mechanical and electrical systems shall be completed at a maximum interval of 3 years. This interval may be reduced, based on the recommendation of the Audit Team Leader, and with the approval of the Division, depending on the extent and rate of deterioration or other factors.*

The maximum interval for underwater Audits is dependent upon the condition of the facility, the construction material type and/or the environment at the mudline, as shown in Table 31F-2-2.

If there are no changes in the defined purpose (see subsection 3102F.3.6.1) of the berthing system, then analyses from previous Audits may be referenced. However, if there is a significant change in a berthing system, or when deterioration or damage must be considered, a new analysis may be required.

The Division may require an Audit to justify changes in the use of a berthing system. An example of such change would be in the berthing and mooring configuration of larger or smaller vessels relative to dolphin and fender spacing, and potential resultant modification to operational environmental limitations (e.g. wind speed).

Subsequent audits of the above water and underwater structures and mechanical and electrical systems may or may not be performed concurrently, depending upon the required inspection intervals based on the prior audit report.

3102F.3.4 Audit Team

3102F.3.4.1 Project Manager. *The Audit shall be conducted by a multi-disciplinary team under the direction of a Project Manager representing the MOT. The Project Manager shall have specific knowledge of the MOT and may serve other roles on the Audit Team.*

3102F.3.4.2 Audit Team Leader. *The Audit Team Leader shall lead the on-site audit team and shall be responsible for directing field activities, including the inspection of all structural, mechanical and electrical systems. The Team Leader shall be a California registered civil or structural engineer and may serve other roles on the audit team.*

3102F.3.4.3 Structural Inspection Team. *The structural inspection shall be conducted under the direction of a registered civil or structural engineer.*

All members of the structural inspection team shall be graduates of a 4-year civil/structural engineering, or closely related (ocean/coastal) engineering curriculum, and shall have been certified as an Engineer-in-Training; or shall be technicians who have completed a course of study in structural inspections. The minimum acceptable course in structural inspections shall include 80 hours of instruction specifically related to structural inspection, followed by successful completion of a comprehensive examination. An example of an acceptable course is the U.S. Department of Transportation's "Safety Inspection of In-Service Bridges". Certification as a Level IV Bridge Inspector by the National Institute of Certification in Engineering Technologies (NICET) shall also be acceptable [2.3].

For underwater inspections, the registered civil or structural engineer directing the underwater structural inspection shall also be a commercially trained diver or equivalent and shall actively participate in the inspection, by personally conducting a minimum of 25 percent of the underwater examination [2.3].

Each underwater team member shall also be a commercially trained diver, or equivalent. Divers performing manual tasks, such as cleaning or supporting the diving operation, but not conducting or reporting on inspections may have lesser technical qualifications [2.3].

3102F.3.4.4 Seismic Structural Analyst. *A California registered civil or structural engineer shall perform the seismic structural evaluation required for the Audit.*

3102F.3.4.5 Electrical Inspection Team. *A registered electrical engineer shall direct the on-site team performing the inspection and evaluation of electrical components and systems.*

3102F.3.4.6 Mechanical Inspection Team. *A registered engineer shall direct the on-site team performing the inspection of pipeline, mechanical and fire systems.*

3102F.3.4.7 Divisional Representation. *The Division representative(s) may participate in any Audit as observer(s) and may provide guidance.*

3102F.3.5 Scope of Inspection

3102F.3.5.1 Above Water Structural Inspection. *The above water inspection shall include all accessible components above +3 ft MLLW. Accessible components shall be defined as those components above and below deck that are reachable without the need for excavation or extensive removal of materials that may impair visual inspection. The above water inspection shall include but not be limited to the following:*

1. *Piles*
2. *Pile caps*
3. *Beams*
4. *Deck soffit*
5. *Bracing*
6. *Retaining walls and Bulkheads*
7. *Connections*

TABLE 31F-2-3 UNDERWATER INSPECTION LEVELS OF EFFORT [2.3]					
		Detectable Defects			
Level	Purpose	Steel	Concrete	Timber	Composite
I	General visual/tactile inspection to confirm as-built condition and detect severe damage	Extensive corrosion, holes Severe mechanical damage	Major spalling and cracking Severe reinforcement corrosion Broken piles	Major loss of section Broken piles and bracings Severe abrasion or marine borer attack	Permanent deformation Broken piles Major cracking or mechanical damage
II	To detect surface defects normally obscured by marine growth	Moderate mechanical damage Corrosion pitting and loss of section	Surface cracking and spalling Rust staining Exposed reinforcing steel and/or prestressing strands	External pile damage due to marine borers Splintered piles Loss of bolts and fasteners Rot or insect infestation	Cracking Delamination Material degradation
III	To detect hidden or interior damage, evaluate loss of cross-sectional area, or evaluate material homogeneity	Thickness of material Electrical potentials for cathodic protection	Location of reinforcing steel Beginning of corrosion of reinforcing steel Internal voids Change in material strength	Internal damage due to marine borers (internal voids) Decrease in material strength	N/A

8. *Seawalls*
9. *Slope protection*
10. *Deck topsides and curbing*
11. *Expansion joints*
12. *Fender system components*
13. *Dolphins and deadmen*
14. *Mooring points and hardware*
15. *Navigation aids*
16. *Platforms, ladders, stairs, handrails and gangways*
17. *Backfill (sinkholes/differential settlement)*

3102F.3.5.2 Underwater Structural Inspection. *The underwater inspection shall include all accessible components from +3 ft MLLW to the mudline, including the slope and slope protection, in areas immediately surrounding the MOT. The water depth at the berth(s) shall be evaluated, verifying the maximum or loaded draft specified in the MOT's Operations Manual (2 CCR 2385 (d)) [2.1].*

The underwater structural inspection shall include the Level I, II, and III inspection efforts, as shown in Tables 31F-2-3 and 31F-2-4. The underwater inspection levels of effort are described below, per [2.3]:

Level I – Includes a close visual examination, or a tactile examination using large sweeping motions of the hands where visibility is limited. Although the Level I effort is often referred to as a "Swim-By" inspection, it must be detailed enough to detect obvious major damage or deterioration due to overstress or other severe deterioration. It should confirm the continuity of the full length of all members and detect undermining or exposure of normally buried elements. A Level I effort may also include limited probing of the substructure and adjacent channel bottom.

Level II – A detailed inspection which requires marine growth removal from a representative sampling of components within the structure. For piles, a 12-inch high band should be cleaned at designated locations, generally near the low waterline, at the mudline, and midway between the low waterline and the mudline. On a rectangular pile, the marine growth removal should include at least three sides; on an octagon pile, at least six sides; on a round pile, at least three-fourths of the perimeter. On large diameter piles, 3 ft or greater, marine growth removal should be effected on 1 ft by 1 ft areas at four locations approximately equally spaced around the perimeter, at each elevation. On large solid faced elements such as retaining structures, marine growth removal should be effected on 1 ft by 1 ft areas at the three specified elevations. The inspection should also focus on typical areas of weakness, such as attachment points and welds. The Level II effort is intended to detect and identify damaged and deteriorated areas that may be hidden by surface biofouling. The thoroughness of marine growth removal should be governed by what is necessary to discern the condition of the underlying structural material. Removal of all biofouling staining is generally not required.

TABLE 31F-2-4

SCOPE OF UNDERWATER INSPECTIONS [2.3]

Level		Sample Size and Methodology[1, 2]							
		Steel		Concrete		Timber		Composite	Slope Protection/ Channel Bottom or Mudline-Scour
		Piles	Bulkheads/ Retaining Walls	Piles	Bulkheads/ Retaining Walls	Piles	Bulkheads/ Retaining Walls	Piles	
I	Sample Size: Method:	100% Visual/ Tactile	100% Visual/ Tactile	100% Visual/ Tactile	100% Visual/ Tactile	100% Visual/ Tactile	100% Visual/ Tactile	100% Visual/ Tactile	100% Visual/ Tactile
II	Sample Size: Method:	10% Visual: Removal of marine growth in 3 bands	Every 100 LF Visual: Removal of marine growth in 1 SF areas	10% Visual: Removal of marine growth in 3 bands	Every 100 LF Visual: Removal of marine growth in 1 SF areas	10% Visual: Removal of marine growth on 3 bands Measurement: Remaining diameter	Every 50 LF Visual: Removal of marine growth in 1 SF areas	10% Visual: Removal of marine growth in 3 bands	0%
III	Sample Size: Method:	5% Remaining thickness measurement; electrical potential measurement; corrosion profiling as necessary	Every 200 LF Remaining thickness measurement; electrical potential measurement; corrosion profiling as necessary	0% N/A	0% N/A	5% Internal marine borer infestation evaluation	Every 100 LF Internal marine borer infestation evaluation	0%	0%

1 *The stated sample size may be reduced in the case of large structures where statistically representative sampling can be demonstrated to the Division in accordance with these standards. The sampling plan must be representative of all areas and component types (i.e. approach trestles, pier/wharf, dolphins, inboard, outboard, batter, vertical, concrete, steel, timber, etc.). Any reduced sampling plan proposed to the Division must include the Level I inspection of all piles around the perimeter of the facility where vessels may berth or where debris may impact or accumulate. If the reduced sampling plan proposes to conduct less than 100 percent Level I effort, then the results of the inspection must be carefully monitored. If significant deterioration is observed on any component, which could reasonably be expected to be present on additional components, and which could have a detrimental effect on the load bearing capacity of the structure either locally or globally, then the inspection scope shall be increased to include a 100 percent Level I effort. See reference [2.2].*

2 *The minimum inspection sampling size for small structures shall include at least two components.*

LF = Linear Feet; SF = Square Feet; N/A = Not Applicable

Level III – A detailed inspection typically involving non-destructive or partially-destructive testing, conducted to detect hidden or interior damage, or to evaluate material homogeneity.

Typical inspection and testing techniques include the use of ultrasonics, coring or boring, physical material sampling and in-situ hardness testing. Level III testing is generally limited to key structural areas, areas which are suspect, or areas which may be representative of the underwater structure.

3102F.3.5.3 Special Inspection Considerations

3102F.3.5.3.1 Coated Components. *For coated steel components, Level I and Level II efforts should focus on the evaluation of the integrity and effectiveness of the coating. The piles should be inspected without damaging the coating. Level III efforts should include ultrasonic thickness measurements without removal of the coating, where feasible.*

3102F.3.5.3.2 Encased Components. *For steel, concrete or timber components that have been encased, the Level I and II efforts should focus on the evaluation of the integrity of the encasement. If evidence of significant damage to the encasement is present, or if evidence of significant deterioration of the underlying component is present, then the damage evaluation should consider whether the encasement was provided for protection and/or structural capacity. Encasements should not typically be removed for an Audit.*

For encasements on which the formwork has been left in place, the inspection should focus on the integrity of the encasement, not the formwork. Level I and Level II efforts in such cases should concentrate on the top and bottom of the encasement. For concrete components, if deterioration, loss of bonding, or other significant problems with the encasement are suspected, it may be necessary to conduct a Special Inspection, including coring of the encasement and laboratory evaluation of the materials.

3102F.3.5.3.3 Wrapped Components. *For steel, concrete or timber components that have been wrapped, the Level I and II efforts should focus on the evaluation of the integrity of the wrap. Since the effectiveness of a wrap may be compromised by removal, and since the removal and re-installation of wraps is time-consuming, it should not be routinely done. However, if evidence of significant damage exists, or if the effectiveness of the wraps is in question, then samples should be removed to facilitate the inspection and evaluation. The samples may be limited to particular zones or portions of members if damage is suspected, based on the physical evidence of potential problems. A minimum sample size of three members should be used. A five-percent sample size, up to 30 total members, may be adequate as an upper limit.*

For wrapped timber components, Level III efforts should consist of removal of the wraps from a representative sample of components in order to evaluate the condition of the timber beneath the wrap. The sample may be limited to particular zones or portions of the members if damage is suspected (e.g. at the mudline/bottom of wrap or in the tidal zone). The sample size should be determined based on the physical evidence of potential problems and the aggressiveness of the environment. A minimum sample size of three members should be used. A five-percent sample size, up to 30 total members, may be adequate as an upper limit.

3102F.3.5.4 Mechanical and Electrical Equipment. *The inspection of mechanical and electrical equipment shall include but not be limited to the following components and systems:*

1. *Loading arms*
2. *Cranes and lifting equipment, including cables*
3. *Piping/manifolds and supports*
4. *Oil transfer hoses*
5. *Fire detection and suppression systems*
6. *Vapor control system*
7. *Sumps/sump tanks*
8. *Vent systems*
9. *Pumps and pump systems*
10. *Lighting*
11. *Communications equipment*
12. *Gangways*
13. *Electrical switches and junction boxes*
14. *Emergency power equipment*
15. *Air compressors*
16. *Meters*
17. *Cathodic protection systems*
18. *Winches*
19. *ESD and other control systems*
20. *Ladders*

All alarms, limit switches, load cells, current meters, anemometers, leak detection equipment, etc., shall be operated and/or tested to the extent feasible, to ensure proper function.

3102F.3.6 Evaluation and Assessment.

3102F.3.6.1 Terminal Operating Limits. *The physical boundaries of the facility shall be defined by the berthing system operating limits, along with the vessel size limits and environmental conditions.*

The Audit shall include a "Statement of Terminal Operating Limits", which must provide a concise statement of the purpose of each berthing system in terms of operating limits. This description must at least include, the minimum and maximum vessel sizes, including Length Overall (LOA), beam, and maximum draft with associated displacement (see Fig. 31F-2-1).

In establishing limits for both the minimum and maximum vessel sizes, due consideration shall be given to water depths, dolphin spacing, fender system limitations, manifold height and hose/loading arm reach, with allowances for tidal fluctuations, surge, and drift.

Maximum wind, current, or wave conditions, or combinations thereof, shall be clearly defined as limiting conditions for vessels at each berth, both with and without active product transfer.

3102F.3.6.2 Mooring and Berthing. *Mooring and berthing analyses shall be performed in accordance with Section 3105F. The analyses shall be consistent with the terminal operating limits and the structural configuration of the wharf and/or dolphins and associated hardware.*

3102F3.6.3 Structure. *A structural evaluation, including a seismic analysis, shall be performed in accordance with Sections 310F3 through 3107F. Such evaluation shall consider local or global reduction in capacity, as determined from the inspection.*

Based on inspection results, structural analyses and engineering judgment, CARs shall be assigned on a global basis, independently for above and underwater structures. The CARs defined in Table 31F-2-5 shall be used for this purpose. The CAR documents the structural fitness-for-purpose. Structural component deficiencies may be assigned RAPs as per Table 31F-2-6. The assigned ratings shall remain in effect until all the significant corrective action has been completed to the satisfaction of the Division, or until completion of the next Audit.

3102F3.6.4 Mechanical and Electrical Systems. *An evaluation of all mechanical and electrical systems and components shall be performed in accordance with Sections 3108F through 3111F of these standards. If a pipeline analysis is required, forces and imposed seismic displacements resulting from the structural analysis shall be considered. Mechanical and electrical component deficiencies may be assigned ratings from Table 31F-2-6.*

3102F.3.7 Follow-up Actions. *Structural follow-up actions as described in Table 31F-2-7 shall be assigned. Multiple follow-up actions may be assigned; however, guidance should be provided as to the order in which the follow-up actions should be carried out.*

If a CAR of "1" (Table 31F-2-5) or a RAP of "P1" (Table 31F-2-6) or "Emergency Action" using Table 31F-2-7, is assigned to a berthing system, the Division shall be notified immediately. The audit report shall include implementation schedules for all follow-up and remedial actions. Follow-up and remedial actions and implementation schedules are subject to Division approval. Follow-up actions shall also state the maximum interval before the next audit.

3102F.3.8 Documentation and Reporting. *The audit report shall be signed and stamped by the Audit Team Leader.*

Each Audit, whether partial or complete, shall be adequately documented. Partial audits cover only specific systems or equipment examined. The resulting report shall summarize and reference relevant previous ratings and deficiencies.

The contents of the audit report for each berthing system shall, at a minimum, include the following as appropriate:

Executive Summary *– a concise summary of the audit results and analyses conclusions. It shall include summary information for each berthing system, including an overview of the assigned follow-up actions (See Example Tables ES-1 and ES-2).*

Table of Contents

Body of Report

Introduction – *a brief description of the purpose and scope of the audit, as well as a description of the inspection/evaluation methodology used for the audit.*

Existing Conditions *– a brief description, along with a summary of the observed conditions. Subsections should be used to describe the above water structure, underwater structure and mechanical and electrical systems, to the extent each are included in the scope of the audit. Photos, plan views and sketches shall be utilized as appropriate to describe the structure and the observed conditions. Details of the inspection results such as test data, measurements data, etc. shall be documented in an appendix.*

Evaluation and Assessment - *a CAR shall be assigned to structural systems (above and under water). Mooring and berthing analyses, structural analysis results, and all supporting calculations shall be included in appendices as appropriate to substantiate the ratings. However, the results and recommendations of the engineering analyses shall be included in this section. Component deficiencies should be described and a corresponding RAP assigned.*

Follow-up Actions – *Specific structural follow-up actions shall be documented (Table 31F-2-7) and remedial schedules included, for each audited system. Audit Team Leaders shall specify which follow-up actions require a California registered engineer to certify that the completion is acceptable.*

Appendices *– When appropriate, the following appendices shall be included:*

1. *Background data on the terminal - description of the service environment (wind/waves/ currents), extent and type of marine growth, unusual environmental conditions, etc.*
2. *Inspection/testing data*
3. *Mooring and berthing analyses*
4. *Structural and seismic analyses and calculations*
5. *Geotechnical report*
6. *MOT Fire Plan*
7. *Pipeline stress and displacement analyses*
8. *Mechanical and electrical system documentation*
9. *Photographs and/or sketches shall be included to document typical conditions and referenced deficiencies, and to justify CARs and RAPs.*
10. *Condition Assessment Rating (CAR) report and supporting data*
11. *Remedial Action Priorities (RAP) report and supporting data*

3102F.3.9 Action Plan Implementation Report. *Within 90 days of completion of the remedial measures (for serious deficiencies, such as P1, P2, or any structural CAR less than 5) specified in the follow-up action plan(s), a report shall be submitted to the Division and shall include:*

1. *A description of each action taken*
2. *Updated RAPs and CARs*
3. *Supporting documentation with calculations and/or relevant data*

TABLE 31F-2-5 CONDITION ASSESSMENT RATINGS (CAR) [2.3]		
Rating		**Description of Structural Systems, Above and Below Water Line**
6	**Good**	*No problems or only minor problems noted. Structural elements may show very minor deterioration, but no overstressing observed. The capacity of the structure meets the requirements of this standard.* *The structure should be considered fit-for-purpose. No repairs or upgrades are required.*
5	**Satisfactory**	*Limited minor to moderate defects or deterioration observed, but no overstressing observed. The capacity of the structure meets the requirements of this standard.* *The structure should be considered fit-for-purpose. No repairs or upgrades are required.*
4	**Fair**	*All primary structural elements are sound; but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present, but do not significantly reduce the load bearing capacity of the structure. The capacity of the structure is no more than 15 percent below the structural requirements of this standard, as determined from an engineering evaluation.* *The structure should be considered as marginal. Repair and/or upgrade measures may be required to remain operational. Facility may remain operational provided a plan and schedule for remedial action is presented to and accepted by the Division.*
3	**Poor**	*Advanced deterioration or overstressing observed on widespread portions of the structure, but does not significantly reduce the load bearing capacity of the structure. The capacity of the structure is no more than 25 percent below the structural requirements of this standard, as determined from an engineering evaluation.* *The structure is not fit-for-purpose. Repair and/or upgrade measures may be required to remain operational. The facility may be allowed to remain operational on a restricted or contingency basis until the deficiencies are corrected, provided a plan and schedule for such work is presented to and accepted by the Division.*
2	**Serious**	*Advanced deterioration, overstressing or breakage may have significantly affected the load bearing capacity of primary structural components. Local failures are possible and loading restrictions may be necessary. The capacity of the structure is more than 25 percent below than the structural requirements of this standard, as determined from an engineering evaluation.* *The structure is not fit-for-purpose. Repairs and/or upgrade measures may be required to remain operational. The facility may be allowed to remain operational on a restricted basis until the deficiencies are corrected, provided a plan and schedule for such work is presented to and accepted by the Division.*
1	**Critical**	*Very advanced deterioration, overstressing or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur and load restrictions should be implemented as necessary. The capacity of the structure is critically deficient relative to the structural requirements of this standard.* *The structure is not fit-for-purpose. The facility shall cease operations until deficiencies are corrected and accepted by the Division.*

TABLE 31F-2-6 COMPONENT DEFICIENCY REMEDIAL ACTION PRIORITIES (RAP)	
Remedial Priorities	**Description and Remedial Actions**
P1	*Specified whenever a condition that poses an immediate threat to public health, safety or the environment is observed. Emergency Actions may consist of barricading or closing all or portions of the berthing system, evacuating product lines and ceasing transfer operations.* *The berthing system is not fit-for-purpose. Immediate remedial actions are required prior to the continuance of normal operations.*
P2	*Specified whenever defects or deficiencies pose a potential threat to public health, safety and the environment. Actions may consist of limiting or restricting operations until remedial measures have been completed.* *The berthing system is not fit-for-purpose. This priority requires investigation, evaluation and urgent action.*
P3	*Specified whenever systems require upgrading in order to comply with the requirement of these standards or current applicable codes. These deficiencies do not require emergency or urgent actions.* *The MOT may have limitations placed on its operational status.*
P4	*Specified whenever damage or defects requiring repair are observed.* *The berthing system is fit-for-purpose. Repair can be performed during normal maintenance cycles, but not to exceed one year.*
R	*Recommended action is a good engineering/maintenance practice, but not required by these standards.* *The berthing system is fit-for-purpose.*

TABLE 31F-2-7 STRUCTURAL FOLLOW-UP ACTIONS [2.3]	
Follow-up Action	**Description**
Emergency Action	*Specified whenever a condition which poses an immediate threat to public health, safety or the environment is observed. Emergency Actions may consist of barricading or closing all or portions of the berthing system, limiting vessel size, placing load restrictions, evacuating product lines, ceasing transfer operations, etc.*
Engineering Evaluation	*Specified whenever structural damage or deficiencies are observed which require further investigation or evaluation, to determine appropriate follow-up actions.*
Repair Design Inspection	*Specified whenever damage or defects requiring repair are observed. The repair design inspection is performed to the level of detail necessary to prepare appropriate repair plans, specifications and estimates.*
Upgrade Design and Implementation	*Specified whenever the structural system requires upgrading in order to comply with the requirements of these standards and current applicable codes.*
Special Inspection	*Typically specified to determine the cause or significance of non-typical deterioration, usually prior to designing repairs. Special testing, laboratory analysis, monitoring or investigation using non-standard equipment or techniques are typically required.*
Develop and Implement Repair Plans	*Specified when the Repair Design Inspection and required Special Inspections have been completed. Indicates that the structure is ready to have repair plans prepared and implemented.*
No Action	*Specified when no further action is necessary until the next scheduled audit or inspection.*

Example

EXECUTIVE SUMMARY TABLE (ES-1)
GLOBAL STRUCTURAL CONDITION ASSESSMENT RATINGS (CAR)

Berthing System	System	Condition Assessment Rating	From this Audit[1]	From Previous Audit[1]	Next Audit Due (Mo/Yr)	Assigned Follow-Up Actions	Fit-for-Purpose?
North Wharf	*Above Water Structure*	*4 (Fair)*	*4 (date)*		*6/2004*	*Upgrade Design and Implementation*	*No*
	Underwater Structure	*5 (Satisfactory)*		*4 (date)*	*10/2006*		*Yes*
South Wharf	*Above Water Structure*	*4 (Fair)*	*4 (date)*		*6/2004*	*Repair Design Inspection*	*No*
	Underwater Structure	*3 (Poor)*		*4 (date)*	*10/2006*	*Special Inspection; Repair Design Inspection*	*No*
Dolphin, Trestle, etc.							

1. Place check mark and date of respective audit in proper column to indicate for each structural system, whether the system was included in the current audit or the results are summarized from a previous audit.

Example

EXECUTIVE SUMMARY TABLE (ES-2)
COMPONENT DEFICIENCY REMEDIAL ACTION PRIORITIES (RAP)

Berthing System	*Deficiency*	*Remedial Action Priority (RAP) (P1-P4)*	*From this Audit*	*From Previous Audit*	*Next Audit Due (Mo/Yr)*	*Description of Planned Remedial Action*	*Fit-For-Purpose?*
North Wharf	*Fire main leaking*	***P3***		*4 (date)*	*6/2004*	*Repair*	*No*
	Pipeline badly corroded	***P2***	*4 (date)*			*Investigate; urgent action required*	
	Electrical (Class I, Div 2 violation)	***P1***	*4 (date)*			*Immediate remedial action required*	

3102F.4 Post-Event Inspection. *A Post-Event Inspection is a focused inspection following a significant, potentially damage-causing event such as an earthquake, storm, vessel impact, fire, explosion or tsunami. The primary purpose is to assess the integrity of structural, mechanical and electrical systems. This assessment will determine the operational status and/or any remedial measures required.*

3102F.4.1 Notification and Action Plan. *Notification as per 2 CCR 2325(e) [2.1] shall be provided to the local area Division field office. The notification shall include, as a minimum:*

1. *Brief description of the event*
2. *Brief description of the nature, extent and significance of any damage observed as a result of the event*
3. *Operational status and any required restrictions*
4. *Statement as to whether a Post-Event Inspection will be carried out*

The Division may carry out or cause to be carried out, a Post-Event Inspection. In the interim, the Division may direct a change in the Operations Manual, per 2 CCR 2385 (f)(3) [2.1].

If a Post-Event Inspection is required, an Action Plan shall be submitted to the Division within five (5) days after the event. This deadline may be extended in special circumstances. The Action Plan shall include the scope of the inspection (above water, underwater, electrical, mechanical systems, physical limits, applicable berthing systems, etc.) and submission date of the final report. The Action Plan is subject to Division approval.

3102F.4.2 Inspection Team. *The qualifications of the inspection team shall be the same as those prescribed in subsection 3102F.3.4. Division representatives may participate in any Post-Event Inspection, as observers, and may provide guidance.*

3102F.4.3 Scope. *The Post-Event Inspection shall focus on the possible damage caused by the event.*

General observations of long-term or preexisting deterioration such as significant corrosion-related damage or other deterioration should be made as appropriate, but should not be the focus of the inspection. The Inspection shall always include an above-water assessment of structural, mechanical and electrical components.

The Inspection Team Leader shall determine the need for, and methodology of, an underwater structural assessment, in consultation with the Division. Above water observations, such as shifting or differential settlement, misalignments, significant cracking or spalling, bulging, etc. shall be used to determine whether or not an underwater assessment is required. Similarly, the Inspection Team Leader shall determine, in consultation with the Division, the need for, and methodology of any supplemental inspections (e.g. Special Inspections (see subsection 3102F.3.5.3).

The following information may be important in determining the need for, and methodology of, the Post-Event Inspection:

1. *Earthquakes or vessel or debris impact typically cause damage both above and below the water line. Following a major earthquake, the inspection should focus on components likely to attract highest lateral loads (batter or shorter piles in the rear of the structure, etc.). In case of vessel or debris impact, the inspection effort should focus on components in the path of the impact mass.*
2. *Major floods or tsunamis may cause undermining of the structure, and/or scouring at the mudline.*
3. *Fire damage varies significantly with the type of construction materials but all types may be adversely affected. Special Inspections (sampling and laboratory testing) shall be conducted, as determined by the Inspection Team Leader, in order to determine the nature and extent of damage.*

TABLE 31F-2-8 *POST-EVENT RATINGS AND REMEDIAL ACTIONS [2.3]*		
Rating	***Summary of Damage***	***Remedial Actions***
A	*No significant event-induced damage observed.*	*No further action required. The berthing system may continue operations.*
B	*Minor to moderate event-induced damage observed but all primary structural elements and electrical/mechanical systems are sound.*	*Repairs or mitigation may be required to remain operational. The berthing system may continue operations.*
C	*Moderate to major event-induced damage observed which may have significantly affected the load bearing capacity of primary structural elements or the functionality of key electrical/mechanical systems.*	*Repairs or mitigation may be necessary to resume or remain operational. The berthing system may be allowed to resume limited operations.*
D	*Major event-induced damage has resulted in localized or widespread failure of primary structural components; or the functionality of key electrical/mechanical systems has been significantly affected. Additional failures are possible or likely to occur.*	*The berthing system may not resume operations until the deficiencies are corrected.*

4. *High wind or wave events often cause damage both above and below the water line. An underwater inspection may be required if damage is visible above the waterline. Structural damage may be potentially increased if a vessel was at the berth during the event. The effects of high wind may be most prevalent on equipment and connections of such equipment to the structure.*

The methodology of conducting an underwater Post-Event Inspection should be established with due consideration of the structure type and type of damage anticipated. Whereas slope failures or scour may be readily apparent in waters of adequate visibility, overstressing cracks on piles covered with marine growth will not be readily apparent. Where such hidden damage is suspected, marine growth removal should be performed on a representative sampling of components in accordance with the Level II effort requirements described in subsection 3102F.3.5.2. The cause of the event will determine the appropriate sample size and locations.

3102F.4.4 Post-Event Ratings. *A post-event rating [2.3] shall be assigned to each berthing system upon completion of the inspection (see Table 31F-2-8). All observations of the above and under water structure, mechanical and electrical components and systems shall be considered in assigning a post-event rating.*

Ratings should consider only damage that was likely caused by the event. Pre-existing deterioration such as corrosion damage should not be considered unless the structural integrity is immediately threatened or safety systems or protection of the environment may be compromised.

Assignment of ratings should reflect an overall characterization of the berthing system being rated. The rating shall consider both the severity of the deterioration and the extent to which it is widespread throughout the facility. The fact that the facility was designed for loads that are lower than the current standards for design should have no influence upon the ratings.

3102F.4.5 Follow-up Actions. *Follow-up actions shall be assigned upon completion of the Post-Event Inspection of each berthing system. Table 31F-2-6 specifies remedial action priorities and actions for mechanical and electrical deficiencies. Table 31F-2-7 specifies various options for structural systems. Multiple follow-up actions may be assigned; however, guidance should be provided as to the order in which the follow-up actions should be carried-out. Follow-up actions shall be subject to Division approval.*

3102F.4.6 Documentation and Reporting. *Documentation of the specific attributes of each defect shall not be required during a Post-Event Inspection. However, a narrative description of significant damage shall be used. The description shall be consistent with and shall justify the post-event rating assigned.*

A report shall be prepared and submitted to the Division upon completion of the Post-Event Inspection and shall, at a minimum, include:

1. *Brief description of the facility including the physical limits of the structure, type of construction material(s), and the mechanical and electrical systems present.*
2. *Brief description of the event triggering the inspection.*
3. *Scope of the inspection (above water, underwater, electrical or mechanical)*
4. *Date of the inspection*
5. *Names and affiliations of inspection team*
6. *Description of the nature, extent and significance of any observed damage resulting from the event.*
7. *Photographs should be provided to substantiate the descriptions and justify the condition rating*

8. *Assignment of a post-event rating*
9. *Statement regarding whether the facility is fit to resume operations and, if so, under what conditions*
10. *Assignment of follow-up action(s)*
11. *Inspection data, drawings, calculations and other relevant engineering materials*
12. *Signature and stamp of Team Leader(s)*

3102F.4.7 Action Plan Report. *Upon completion of all actions delineated in the Action Plan, a final report shall be submitted to the Division to document the work completed. Supporting documentation such as calculations or other relevant data shall be provided in appendices.*

3102F.5 References

[2.1] California Code of Regulations (CCR), Title 2, Division 3, Chapter 1, Article 5, Marine Terminals Inspection and Monitoring, Sections 2315, 2320, 2325, and 2385 (short form example: 2 CCR 2315 = Title 2 of California Code of Regulations, Section 2315).

[2.2] Buslov, V., Heffron, R. and Martirossyan, A., 2001, "Choosing a Rational Sample Size for the Underwater Inspection of Marine Structures," Proceedings, Ports 2001, ASCE Conference, April 29-May 2, Norfolk, VA.

[2.3] Childs, K.M., editor, 2001, "Underwater Investigations - Standard Practice Manual," American Society of Civil Engineers, Reston, VA.

Authority: Sections 8755 and 8757, Public Resources Code.

Reference: Sections 8750, 8751, 8755 and 8757, Public Resources Code.

FIGURE 31F-2-1

EXAMPLE

STATEMENT OF TERMINAL OPERATING LIMITS

BERTHING SYSTEM NAME: _____
FACILITY OWNER/OPERATOR: _____
FACILITY ADDRESS: _____

DATE: _____
No. OF TRANSFERS/YEAR: _____
OIL SPILL AT RISK (BBL): _____
FACILITY SEISMIC CLASSIFICATION: _____
FACILITY MOORING/BERTHING CLASSIFICATION: _____
FACILITY FIRE HAZARD CLASSIFICATION: _____

ALL MOORING LINES SHALL HAVE
A MINIMUM BREAKING STRENGTH OF _____

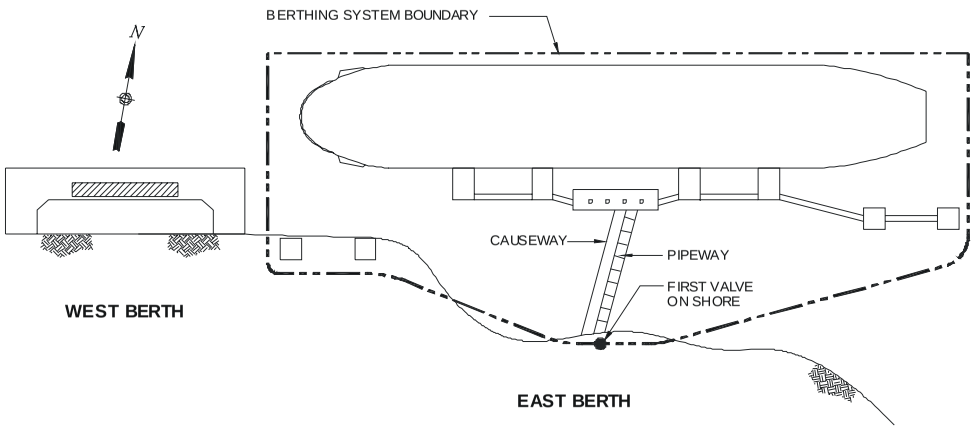
VESSEL SIZE LIMITS:

MAXIMUM VESSEL:
LOA = _____
DWT = _____
BEAM = _____
DRAFT = _____
LBP = _____

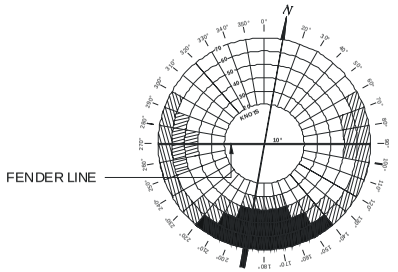
MINIMUM VESSEL:
LOA = _____
DWT = _____
BEAM = _____
DRAFT = _____
LBP = _____

MIN. WATER DEPTH = _____
WITH UNDERKEEL CLEARANCE OF _____
(FROM OPERATION MANUAL)

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



ENVIRONMENTAL CONDITION LIMITS:
(MUST BE QUALIFIED AND DOCUMENTED BY
A MOORING/BERTHING ANALYSIS)



WIND RESTRICTION DIAGRAM

NOTE:

WIND RESTRICTION DIAGRAM IS APPLICABLE WITH A MAXIMUM EBB OR FLOOD CURRENT OF 3.2 KNOTS, WAVE PERIOD T < 4.0 SECONDS, CHANGE IN DRAFT < 6 FT, AND PASSING VESSEL EFFECTS ARE INSIGNIFICANT.

LEGEND:

TERMINATE PRODUCT TRANSFER

DISCONNECT PRODUCT LINES AND DEPART BERTH